Office of the Federal Coordinator for Meteorological Services and Supporting Research

Session Notes

National Hurricane Conference Training Session:
Toward a Safer America: Making the Nation More Resilient to Hurricanes

Monday, April 9, 2001
1:30 p.m. to 5:00 p.m.

Session Facilitator: Mr. Samuel P. Williamson, Federal Coordinator for Meteorology

Panel 1: Managing the Public's Vulnerabilities and Consequences of Hurricanes through Risk Assessment and Risk Management

Moderator:

Dr. Jay Baker	Department of Geography, Florida State University; Vice Chairman, NHC Planning Committee

Rapporteurs:

Mr. Scott Kiser	Program Manager for Hurricane Operations, National Weather Service (NOAA)
Ms. Cynthia Nelson	Senior Staff Meteorologist, Office of the Federal Coordinator for Meteorology

Panelists:

Mr. Eric Webster, Republican Professional Staff for the Environment, Technology, and Standards Subcommittee of the U.S. House of Representatives Committee on Science

Ms. Margaret E. Lawless, Acting Associate Director, Mitigation Directorate, Federal Emergency Management Agency

Dr. James Russell, Vice President for Education and Outreach, Institute of Business & Home Safety

Dr. Christine Johnson, Program Manager, Operations Core Business Unit, Federal Highway Administration (DOT) and Director, ITS Joint Program Office

Mr. Daniel Dubno, Producer and Technologist, CBS News Special Events

1. INTRODUCTION.

The objective of this panel was to offer recommendations and examples on how to strengthen public and private understanding of and support for operational programs and science and engineering research needed to increase our Nation's resilience to hurricane hazards. The speakers focused on improved tools, technologies, and programs that would help mitigate the impacts of hurricane hazards at all levels. In addition, they identified areas of common interest among all levels of government and the private sector that address the critical challenges of building more resilience to hurricane hazards into our communities.

2. PANELISTS.

a. Mr. Eric Webster.

Mr. Webster presented an overview of how the Congressional Committee on Science functions and what the Committee is interested in hearing about. He noted that the Science Committee reviews government programs and budgets for research, science, and technology and looks to the experts to advise them. In terms of this review, he noted policies are in place for dealing with natural hazards, such as earthquakes, droughts, wildfires, and coastal zone management, but there are no specific policies for hurricanes and risk assessment. The Committee will be following the Global Data Information Network (GDIN) project closely to see how it assists in addressing the natural hazards problems. The Natural Disaster Mitigation Act of 2000 should also assist Federal agencies by encouraging better management of natural hazards through multi-hazard mitigation. On the Congressional side, the Natural Disaster Caucus will also provide leadership. Mr. Webster concluded that he wanted to hear from the experts. They need to keep him abreast of any programs or policies specific to hurricanes that would provide sound science advice through programs such as U.S. Weather Research Program (USWRP). He encouraged the group to look into a policy or program management similar to the well-established earthquake research program. He stated Congress tends to react quickly when there is an actual disaster. During non-disaster times, Congress tends to react slowly to requests and changes to programs.

b. Ms. Margaret E. Lawless.

Ms. Lawless addressed the objective of the panel by covering FEMA's Hazards U.S. (HAZUS) project. HAZUS is a computer software package that provides a risk assessment of a natural hazard (only the earthquake module is operational so far) for a location. It is in a standard format, uses GIS-type maps, and reports on the risk of experiencing a natural hazard in an area. This can be used to provide management/leadership with information needed to make mitigation decisions to get the maximum benefits. Eventually, HAZUS will cover hurricanes, wind, and floods thus providing a multi-hazard risk assessment. These reports will be useful at all levels (national, regional, state, and local). Ms. Lawless said there was a new HAZUS Initiative with

the private sector that would help distribute the software and help provide training through a FEMA-run vendor certification program. Part of this initiative will be to establish in 2001 a Natural Hazard Web Server at FEMA, which would provide access to databases, common framework, and interoperability techniques.

Ms. Lawless said the Hurricane preview model for the Atlantic and Gulf of Mexico areas is expected to be completed by December 2002 with the full model finished by 2005. The flood model is also expected by December 2002. An update to the earthquake HAZUS was released in 1999 (HAZUS99) and it now gives reports in terms relevant to policy makers, not just to the scientists.

c. Dr. James Russell.

The Institute of Business & Home Safety (IBHS) is a non-profit organization supporting research, education, and community instruction to promote their "Building Smarter to Prevent Building Over" concept. The natural hazards they currently address include wildfire, earthquake, windstorms, floods, and hailstorms in terms of community land use, property insurance, construction of new buildings, building codes, and retrofitting of old structures. For community land use, IBHS educates people about the relationship between land use and disaster losses, and the value of building out of harms way. IBHS also works with state and local governments to adopt procedures requiring consideration of natural hazards vulnerability in making land use decisions. Recommendations on the construction of new buildings are provided to ensure all new structures will be designed, engineered, and constructed using up-to-date techniques and materials that prepare for natural disasters. IBHS promotes codes, structural design, and engineering techniques and construction material that are low cost and effective in reducing disaster losses. One of the current problems is retrofitting existing structures. IBHS assists by developing cost-effective techniques, establishing incentives for all stakeholders to use these techniques, and organizing and publicizing programs that lead to retrofitting high-risk human care facilities (hospitals, nursing homes, schools, etc). IBHS uses public outreach programs to increase awareness about natural hazards, increase understanding of the associated risks, increase awareness of how to reduce the effects, and promote the desire to reduce the risks/effects. They contact businesses, emergency managers, insurance industry, media, planners, lenders, designers, builders, and the general public. Another area they assist these groups is in their information management where they provide for the collection, analysis and dissemination of natural disaster loss and preparedness information. They also develop and maintain a database of insurer paid losses from natural disasters. One of the key ingredients to making their efforts a success is the required public will to take defensive action. Additional information can be obtained from their web site: http://www.ibhs.org/.

d. Dr. Christine Johnson.

Dr. Johnson first stated that roads are society's lifelines and are depended on for response to hurricanes and other natural disasters and for any evacuations. Dr. Johnson then showed a graph depicting the rate of use of automobiles and the rate of adding roadway capacity over the last 20 years. This dramatically demonstrated the diverging difference between the two—vehicle usage has increased 70%, while highway capacity has only increased 1%. Another statistic concerns the movement of people to our coasts: approximately 2,400 persons each day are moving to the East and Gulf of Mexico coasts. This will result in an increase of people living on the coasts susceptible to hurricanes from 36 million in 1993 to about 76 million by 2010. These statistics emphasized the problems associated with trying to get people to safety through evacuations. The roadways are at capacity now. For an evacuation to be successful, it will require: traffic planning by State and local departments of transportation, real-time/hands-on management by highway departments and emergency managers, detailed communications to drivers on the road, and full use of technology. Once an evacuation is ordered, people need to be able to move quickly and safely to safe locations. This will take multi-agency coordination, information sharing, and collaboration. Technology can change evacuation management. For example, using highway cameras and remote sensing capabilities, highway departments and emergency managers can see what routes are moving and those that are blocked. So traffic can be rerouted broadcasting changes over dedicated radio airways, 511 phone access, Internet web sites, and electric roadway signs.

In summary, Dr. Johnson said one could not assume the roads will always be there for evacuations. This emphasizes the fact that state and local Departments of Transportation need to become active players from planning to evacuation to recovery. Technology can make a difference in responding to emergencies and in supporting more accurate weather forecasts. Dr. Johnson also recommended a nationwide system to gather traffic data which would connect to and supplement local and state systems information.

e. Mr. Daniel Dubno.

Mr. Dubno emphasized the public normally hears about a disaster first from press reports. Therefore, it is especially important for emergency managers to work with media representatives both before and during an event. Unfortunately, these two groups often appear to be at odds with each other. He said the media will usually take their lead from the public officials but need to have information at regular intervals and when changes occur. An event can be managed well but fail because of poor coordination. If the two groups work closely for the benefit of the public, success will be achieved. He stated if you help the press by providing access, data and relevant information, the press will help you. He also believes the media has a good capability to

tell the "story" and is the place the public turns to for the latest information. Traditional communication methods are still important but are enhanced by the use of technology, such as powerful graphics, GIS-based mapping, and Web sites. In his view, a new era of transparency has begun with the availability of "eyes in the sky" (satellites, remote sensing cameras, etc.) with resolutions of 1 meter or smaller. This allows the melding of satellite imagery with storm track to tell a story in 3D.

In summary, Mr. Dubno said the way to get the press involved ahead of time is to foster an ongoing dialog between the media (including their editors) and public officials and to incorporate the media in the planning process and integrate them into the disaster management operations.

3. SUMMARY.

There were three overarching themes from this panel. The first theme was that it is essential to keep abreast of new and innovative technology and to quickly integrate it into operational use. Ensuring the media is an integral part of the disaster management team was the second theme. The third theme was the need for subject experts to keep Congress informed on good science, promising technology, and sensible decisions based on risk management.

Panel 2: Improving Hurricane Preparedness/Response — Employing New Communication Technology and Enhancing Public Outreach/Education

Moderator:

Colonel (S) Mark Welshinger	Assistant Federal Coordinator for USAF/USA Affairs, Office of the Federal Coordinator for Meteorology

Rapporteurs:

Mr. John Ogren	Warning Coordination Meteorologist Program Manager, National Weather Service (NOAA)
Mr. Floyd Hauth	Office of the Federal Coordinator for Meteorology (STC)

Panelists:

Mr. Max Mayfield, Director, Tropical Prediction Center/National Hurricane Center, National Weather Service (NOAA)

Mr. Stu Ostro, Director of Weather Communications, The Weather Channel, Inc.

Brigadier General David L. Johnson, U.S. Air Force Director of Weather

Ms. Helen Wood, Director, Office of Satellite Data Processing and Distribution, National Environmental Satellite, Data, and Information Service (NOAA)

Ms. Maria Pirone, Chair, Government Liaison Committee, Commercial Weather Services Association (CWSA) and Director, Global Data Products & Services, Weather Services Inc. (WSI)

1. INTRODUCTION.

The objectives of this panel were to:

a. Increase understanding of and support for the implementation of new technologies that address communication, information dissemination, and outreach challenges in hurricane preparedness and response programs/activities.

b. Support the implementation of new tools and technologies that improve hurricane information dissemination and notification procedures/processes.

c. Foster more effective use and a better understanding of hurricane advisories and warnings in the public and private sectors.

2. PANELISTS.

a. Mr. Max Mayfield.

Mr. Mayfield focused his presentation on employing new communication technology in NHC operations and enhancing NHC's public outreach and education activities. In communications, a picture is worth a thousand words. The NHC has improved their capabilities to more effectively use color graphics to inform the public about hurricane threats. The NHC was one of the first in the National Weather Service (NWS) to get color graphics on the Internet and to use color graphical displays. Examples of graphics include probabilities of being affected by a hurricane, probabilities of a tropical cyclone reaching various Saffir/Simpson Hurricane Scale categories, depictions of the tropical storm and hurricane wind distributions, and tropical storm/hurricane watches and warnings. It was made clear that, based on feedback from numerous emergency management workshops and meetings such as this one, that there are some people who need to take preparedness steps even before watches and warnings are issued. Examples include the offshore drilling platforms and the U.S. Navy.

The Hurricane Research Division has introduced and tested various displays for wind distribution around storms. The analyses of observed winds are improved but the forecast of the wind distribution has a long way to go. Most current maps for wind radii are done by quadrants of the storm, so if there is a small area of hurricane force winds, the map indicates an entire quadrant of the storm with winds of that magnitude. Also, there are still limitations in the way hurricane size and intensity are displayed and questions remain about the best way to communicate the impacts of a hurricane.

Portions of NHC's outreach and education efforts are conducted in conjunction with NHC's regional responsibilities to the World Meteorological Organization (WMO). Other countries in Region-IV have local warning responsibilities and there is an operational plan to coordinate with them on a routine basis. In addition to these intergovernmental activities, the NHC supports national partnerships such as with FEMA, and participates in programs to educate the public and the media. Training sessions are provided for media groups and emergency managers. Tours of the NHC are available to the public after coordinating with NOAA Public Affairs. During storm events, the NWS/FEMA Hurricane Liaison Team has proven to be a great success.

The NHC continues to seek better ways to get the word out to the public through the media, through awareness tours to major U.S. coastal communities and countries in Region IV, and through the upcoming Hurricane Awareness Week scheduled for May 21-25, 2001.

b. Mr. Stu Ostro.

The Weather Channel (TWC) has provided 19 years of TV broadcast service and characterizes itself as passionate about disaster mitigation. Its outreach activities include sponsorship of The Weather Channel Forum in June 2000, and annual participation in the National Hurricane Conference.

New communication media in use at TWC include:

- New platforms to use technology
- Closed captioning (to reach diverse audiences)
- Emergency management scrolls, an important system with an automated process for use in local areas
- El Canal del Tiempo — TWC now has a Spanish-speaking network — reaching many viewers in hurricane-prone areas of Central and South America including the Caribbean Islands. In addition, meteorologists fluent in Spanish make appearances on the U.S. network to deliver information when tropical cyclones threaten cities with a large Spanish-speaking population, such as Houston and Miami.
- Impact graphics — another way to inform and educate the public and the emergency management community

New meteorology technology available in the weather community, and future priorities:

- Advancements in remote sensing (satellite and radar)
- NOAA/AF flights with new sensors and sampling techniques
- Improved data collection and integration into coupled atmospheric/oceanic models
- Computer forecast models for impacts
- Applications to wave/wave setup/surge, wind (including inland effects), and rainfall

TWC education and training:

- Project Safeside – partnership with American Red Cross – material on weather.com and video network
- Talks to school children, general public and to the emergency management community
- In-house continuing education of staff

Message consistency: there needs to be balance between government and private interests; private entities have rights but too much confusion for users can be counterproductive. TWC always relays all the official information but updates the information and interprets it (discusses trends and impacts).

Bottom Line:
1. Need to develop and use new technology; ongoing education must be a priority. However we need to get back to basics! "What happens at moment of truth?" We can prepare all year but it is what people do when the tropical cyclone hits that tells the story.
2. Beware of over reliance on computer model track predictions (ex. winter storm fiasco in NE)
3. Ensure objectivity in forecasts and action recommended.
4. Update Risk Assessment (RA) of coastal locations and apply to evacuation strategy. Coastal population keeps growing so RAs need continual updating.

Bottom, bottom line: Perfect forecasts won't matter if the message is not communicated effectively and appropriately. The message should be authoritative, concise and understandable. Appropriate means conveying the proper level of seriousness without hype as well as the amount of confidence/uncertainty.

c. Brig Gen David L. Johnson.

General Johnson provided a briefing about what AF Weather (AFW) does in terms of core processes, its role as a key component in the national weather system, the exposure of the military forces to tropical cyclones, and their preparedness for and response to these hazards.

Air Force Weather serves the AF and Army with observations and forecasts of terrestrial and space weather; the mission of the military can't be done if forces have been damaged or destroyed by weather.

Its core functions are to collect and analyze data, develop accurate forecasts, tailor the forecasts to the user and disseminate the information worldwide. In its national role AFW provides: satellite fixes of storms; partnerships with the Navy in manning for the Joint Typhoon Warning Center (JTWC), which protects U.S. Government interests in the Pacific region, Indian Ocean, and westward to the east coast of Africa; observations around the world; regional applications of the Mesoscale Model Version 5 (MM5); partnership in the National Polar-orbiting Operational Environmental Satellite System (NPOESS); co-sponsorship of a study of future radar through the National Research Council; and participation in development of the Weather Research and Forecast Model.

The tropical cyclone threat to AF and Army forces is extensive. There are 27 AF and 22 Army installations vulnerable to such storms in the U.S. plus more facilities and hundreds of thousands of people facing tropical weather threats in the Pacific. Various actions are taken to prepare for these threats. These include training forecasters, helping to develop base/post-level preparation plans, participating in base/post preseason hurricane exercises, and carrying the hurricane awareness message to leaders and citizens. In addition, AFW assists with dissemination of severe weather information through various military media such as cable television, radio and other communication devices.

General Johnson described the Hurricane Warning methodology used on military installations that prescribes various levels of responses to warnings for high winds and other hazards when onset is forecast within 72 hours or less. On the horizon, General Johnson expects AFW activities to provide:

- Better decision aids for weather effects
- Refined models for high-resolution wind forecasts
- Improved satellite fixes of storms
- New airplanes for storm reconnaissance
- NPOESS era satellites by 2010
- Future radar capabilities beyond NEXRAD

In summary General Johnson stated, "It takes the national weather team to protect the lives and property of our citizens."

d. Ms. Helen Wood.

Weather satellites have been in existence for 41 years. The mission of NESDIS is to provide and ensure timely access to global environmental data to promote, protect and enhance the nation's economy, security, environment and quality of life. To fulfill its responsibilities NESDIS acquires, launches and operates geostationary and polar-orbiting, environmental satellites (GOES and POES), operates national environmental data centers (NCDC, NODC, and NGDC), carries out applications development and supporting science, satellite data processing and distribution, and commercial remote sensing licensing. NESDIS has end-to-end responsibility from building, launching, operating satellites, collecting data from U.S. and other satellites, as well as long-term stewardship for environmental data. Hazard support activities include monitoring hazards such as severe weather, geophysical and extreme biological events. Within these categories NESDIS conducts operational hazard monitoring for tropical cyclones, heavy precipitation, volcanic ash clouds, coastal hazards, fires, drought, providing sea and ice information products, and supporting disaster response and recovery. NOAA is generally noted for prediction activities but its tools and techniques are increasingly used for other aspects of disaster support. The intent is to leverage existing capabilities and focus on near real-time access to global satellite data. These sources can be used for worldwide tracking and characterizing tropical cyclones, estimating precipitation, as well as for damage assessment and response. Precipitation intensities are derived from satellites and such information is made available on the web, although not "official". Damage assessment and response information assist the government with maintaining the health of coastal regions. Low light sensors help with estimates of electrical outages and

restoration times.

NESDIS satellite data are provided on a full and open basis. Operationally significant event imagery is available at: www.osei.noaa.gov

Ms. Wood also described a U.S. government-wide effort to reduce disaster losses through better information. The primary objective is to improve decision-making before, during and after emergencies through better access to and quality of data and information. Agencies are working together to make information more accessible and useful for the public. NOAA now has the lead on the Natural Hazards Information Strategy to integrate and improve the reliability and dissemination of environmental information.

e. Maria Pirone.

The theme of Ms. Pirone's presentation was "Enhancing Public Outreach through the Private Sector."

There are a number of changes underway that impact the way the public receives hurricane warning information. Changes in the media market, changes in dissemination technology, advancements in weather tools and enhancements to visualization techniques are all aiding in this transformation. Specifically:

(1) In the media market there has been increased coverage in the traditional outlets. There are more stations with local news and weather coverage and additional growth in the number of cable stations. It is a very competitive environment as exemplified by the birth of network storm centers, each vying to be 1st or number 1. There has also been a proliferation of station web sites as they extend their reach into this new media.

(2) There are a variety of new dissemination devices, which are used for warnings to the public. These include pagers, handheld PCs, and desktop alerting via email. There is also a proliferation of high quality free web sites, which are becoming more local in coverage and more real-time. This is all done through private sector investment.

(3) In addition, meteorologists have access to more advanced tools, such as, local atmospheric models, GIS compatible data, next generation crawl systems, and more data (radar, observations, satellite imagery, etc). These technologies and data ripple down to the viewer who receives more information and expects even more.

(4) Although some visualizations do not aid the operational or emergency managers in planning around impending weather events, they can be very useful as educational tools. Basically they can capture the public's attention when training for disasters.

3. SUMMARY.

The thrust of the questions for this panel led to discussions and comments about concerns that the user/receiver of warnings and watches receives a clear message with which they can evaluate their risks and uncertainties and make evacuation or other decisions accordingly.

In summary, technology has changed the expectations of the public and this has an impact on the messages given by the broadcast media. “Immediate and instantaneous” aren’t fast enough—the public wants better accuracy and they want it earlier. We need collaboration, communication and cooperation to take action to the next level. In doing this activity we need to find ways to work together better.